



# STATE OF IDAHO

## DEPARTMENT OF AGRICULTURE

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### MEMORANDUM

**Date:** March 22, 2006

**From:** Patrick A. Takasugi, Director  
Idaho State Department of Agriculture

**To:** **Idaho Potato Growers, Packers, and Processors**

**Subject:** Recommended Management Practices for dealing with the Potato Tuberworm

A handwritten signature in black ink, appearing to read "Patrick A. Takasugi", written over a circular stamp or mark.

Following is a list of Recommended Management Practices (RMPs) to help deter the potential spread of the potato tuberworm into Idaho. The information was developed by the Idaho State Department of Agriculture (ISDA) and the University of Idaho (U.I.) along with information obtained from the world-wide research community, producers, processors and packers, and specifics from the recent experience gained in Oregon and Washington. Some of the information below may have to be revised for regional differences in potato production, climates, soil types, etc., as our knowledge of the insect increases.

The potato tuberworm (PTW) is the officially recognized common name. The "worm" is the caterpillar that mines in the foliage and tubers of potatoes. The adult moth is more easily monitored by pheromone traps. This insect is sometimes referred to as the potato tuber moth.

**RECOMMENDED MANAGEMENT PRACTICES – The following five points apply to the Idaho and Malheur County, Oregon potato industry as whole:**

- 1) **For this year's harvest, all potato fields within a five mile radius of Parma, Idaho, should be processed as soon as possible and not be put into storage if at all possible.**
- 2) **No potato lots from the Columbia Basin, including the Hermiston, Oregon potato growing area, should be put into storage in Idaho or Malheur County, Oregon**
- 3) **All culls and tare dirt originating from the Columbia Basin, including the Hermiston, OR potato growing area, and the Parma area, should be buried to a depth of at least 12 inches.**
- 4) **No culls from the Columbia Basin, including the Hermiston, Oregon potato growing area origin lots should be fed to cattle in Idaho or Malheur County, Oregon.**
- 5) **No cull potatoes should be brought from the Columbia Basin including the Hermiston, Oregon potato growing area, to Idaho for processing.**
- 6) **All conveyances should be cleaned after delivery to processing facilities and the residue disposed along with the material listed in items three and four above. This would be especially**

true for shipments from the Columbia Basin, Oregon, and Western Idaho

**FOR PROCESSORS AND PACKERS - All of these points could be implemented immediately for all Idaho and Malheur County, Oregon processors and packers:**

- 1) Do not transport any lot of potatoes into Idaho or Malheur County, Oregon that have any level of PTW tuber infestation.
- 2) Make certain that vines are removed from all lots of potatoes to be delivered into Idaho.
- 3) All lots of potatoes from the Columbia Basin should be processed within 48 hours of arrival and not kept in storage in Idaho or Malheur County, Oregon.
- 4) All raw, receiving generated waste and soil at Idaho processor and packer facilities when Columbia Basin grown potatoes are being unloaded, should be buried under at least 12 inches of uncontaminated soil daily as a precaution to prevent PTW spread. In a study from New Zealand, worms were observed digging through 8 inches of soil to reach the surface.
- 5) In the remote case that PTW damage is found in delivered potatoes, cease delivery for that lot. Tare dirt and culls from that lot should be buried and covered as soon as possible.
- 6) PTW traps should be placed in or near storage houses, processing and packing facilities, cull piles, tare dirt piles, and disposal pits and monitored daily.
- 7) Notify ISDA of any PTW detections at the processing, packing or disposal site. Contact Mike Cooper or Lee Stacey at (208) 332-8500.
- 8) All ISDA shipping point inspectors are trained to identify PTW damage.

**IN-FIELD DETECTION PROCEDURES - It may be too late to implement these procedures for this year, but they should be considered for the future:**

If tuber moths are in the area of the field, based upon the U.I./ISDA trap information, **a single pheromone trap is to be placed in or near the edge of the field at crop emergence and must be checked weekly (for fields greater than 50 acres in size, two traps should be placed)**. The trap(s) are to be monitored at least until the field has been harvested or longer to gauge PTW population locations and levels. Trap catches may be higher post-harvest. Moth populations are to be documented weekly. Plants in the field should be inspected for infestation and the RMPs outlined below should be followed. If no PTW moths are found for the trapping period, the field is to be designated as one with no or light infestation. If moths are found in a field, daily trap monitoring maybe necessary.

**IN FIELD CONTROL:**

- 1) Plant PTW-free seed.
- 2) When planning crop rotations, choose potato fields as distant from previous potato plantings as possible.
- 3) Plant and hill the **potatoes so as to minimize shallow set of potatoes**. Avoid washing off the hills. Use the information found by the U.I./ISDA trapping network and consult the U.I. entomology website to see if tuber moths are in the area. If tuberworms are in the area, growers must place moth traps near or in fields and use chemical control to reduce populations when they are detected. There is no established treatment threshold for the Pacific Northwest that the research community can agree upon. As newer Pacific Northwest PTW trap and damage thresholds are developed, they will be

made available to the industry. There is some feeling among the research community that this number may need to be very low; to the point that the detection of any moths is sufficient justification for treating. If moths are found in a field, daily trap monitoring maybe necessary.

- 4) “Use a chemical in the normal spray program for aphids which will kill tuber moth.” The best economic use of insecticides has not been proven (e.g. to begin early and maintain a spray program until digging; or start later when populations are higher, but the canopy is still green and lush and continue treatment until digging; or incorporate tuberworm control into the normal spray program for other pests). All of the chemicals in the “expected” column in the table below are being tested this year along with new compounds not yet registered to ensure that they are effective in our region.

<b>*Insecticides expected to have efficacy</b>	<b>Insecticides with little to no efficacy</b>
Guthion - adulticide, larvicide	Admire, Gaucho, Provado, Genesis
Monitor – ovacide, adulticide, larvicide	Platinum, Cruiser, Actara
Baythroid, Leverage – larvicide, adulticide	Temik
Avaunt – ovacide, larvacide	Vydate
Lannate - ovicide, larvacide, adulticide	Dimethoate
Asana – larvicide, adulticide	Rimon
Success - larvicide	Fulfill
Furadan - ovacide, adulticide, larvicide	Methyl Parathion
Imidan - larvicide, adulticide	Di-Syston
Pounce - larvicide, adulticide	
Ambush - larvicide, adulticide	
Permethrin - larvicide, adulticide	

- 5) If populations are heavy late in the growing season and larvae are in the leaves, the pyrethroid insecticides have a shorter pre-harvest interval, usually less than 10 days.
- 6) Harvest under green vines with at least 50% of the plant vines being green to reduce tuber infestation. There is some research to suggest that sulfuric acid defoliation in areas where this is a standard practice will also kill most immature PTW life stages in the plant leaves and stems. The tuberworm prefers to infest green leaves and stems over tubers, but when green leaves and stems are not available, it will go to tubers.
- 7) Killing down vines and immediately covering with soil is an effective way to control damage in tubers. (OSU Hermiston showed that waiting 3 days after vine kill applications to cover hills with soil increased tuber infestation from 1% to 5 %).
- 8) Keep the soil surface wet as this may reduce tuberworm infestation in tubers.
- 9) Do not roll the vines. This operation will reduce cracks but will also expose tubers; especially if the fields are dry and the soil is light or sandy (OSU Hermiston showed increases in moth damage in tubers by rolling). In heavy soils this could provide a good measure of control and should be done immediately after vine kill.
- 10) Do not beat the vines as this will force the larvae out onto the soil where they will infest any tubers that they can contact. Again, in heavy soils this could be a good control method.
- 11) Remove all vines from potatoes while harvesting.
- 12) Destroy all vines and tubers left in the field after harvest by disking etc.
- 13) Destroy volunteer plants in uncultivated lands or other crop fields.
- 14) Destroy solanaceous weeds, notably nightshades, which may serve as alternate hosts for PTW.

**\*The chemicals listed above are a guide for control measures. Growers should consult their local agricultural extension educator or crop advisor for a chemical control recommendation for their specific situation.**

**Risk Factors for Tuber Damage:** There are a few factors that predispose a field to tuber damage by tuber worm:

**1.) Dry Soil.** Previous research shows that dry soil due to furrow irrigation, drought, or ending of irrigation leads to tuber damage. Conversely, wet soil prevents almost all tuber damage by PTW.

**2.) Dead Vines.** Tuberworm larvae live in the leaves and stems of potato plants during the growing season, and all evidence suggests that they prefer green foliage over tubers. So, almost all tuber damage occurs after vines begin to die or following chemical defoliation. Dry soil during this time makes tubers especially vulnerable.

**3.) Exposed/Shallow Tubers.** Research around the world has shown that tubers infested by tuberworm larvae are almost always within 2 inches of the soil surface. Tubers deeper than 2 inches are rarely infested.

**4.) Large Moth Populations.** Left unchecked, tuberworm populations can become overwhelmingly huge. It is a good idea to watch tuberworm numbers during the season and make an effort to keep them in check. Waiting until vine decline or kill to attempt tuberworm control is an invitation to failure.

This information and recommendations will be revised and updated as our knowledge of PTW in the Pacific Northwest increases.

### **References:**

- 1) Potato Tuberworm: A new Threat for Idaho Potatoes, University of Idaho, Current Information Series (CIS 1125).
- 2) 2005 Integrated Pest Management Program for Insects and Mites in Oregon and Washington Potatoes. Schreiber, A. – Agricultural Development Group, Inc., A. Jensen – Washington Potato Commission, G. Reed - Oregon State University, K. Pike – Washington State University.
- 3) Dr. Phil Hamm, OSU Agricultural Extension Service, Hermiston, OR - Personal Communication
- 4) Dr. Juan Manual Alvarez, University of Idaho, Aberdeen, ID – Personal Communication
- 5) Dr. James B. Johnson, University of Idaho – Personal Communication
- 6) Dr. Andy Jensen, Washington Potato Commission – Personal Communication
- 7) Dr. Alan Schreiber, PhD., Agriculture Development Group, Eltopia, WA – Personal Communication

### **Websites:**

University of Idaho South Eastern and South Central Potato Tuberworm Survey Page.  
[http://www.uidaho.edu/so-id/entomology/Potato%20Tuberworm%20Survey\\_05.htm](http://www.uidaho.edu/so-id/entomology/Potato%20Tuberworm%20Survey_05.htm)

OSU Hermiston Agricultural Research and Extension Center.

<http://oregonstate.edu/dept/hermiston/>

Treasure Valley, Idaho Pest Alert Network

<http://www.tvpestalert.net/index.php3>

Washington Potato Commission

<http://www.potatoes.com/Research.cfm>